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TITLE: Fixing roller for copier, printer, includes
release
layer formed on ultrathin stainless steel
sleeve arranged
on elastic layer

PATENT-ASSIGNEE: DIMUKO KK[DIMUN]

PRIORITY-DATA: 2000JP-0242582 (August 10, 2000)

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INT-CL (IPC): F16C013/00, G03G015/20

ABSTRACTED-PUB-NO: JP2002055557A

BASIC-ABSTRACT:

NOVELTY - An ultrathin stainless steel sleeve (4) of thickness 0.03-0.15 mm is arranged on an elastic layer (3) formed on a support (2). A release layer (5) is formed on the sleeve.

DETAILED DESCRIPTION.- An INDEPENDENT CLAIM is also included for fixing apparatus.

USE - For image fixing apparatus (claimed) of copier, printer.

ADVANTAGE - Improves image fixing speed. Maintains stable temperature

distribution during fixing, so as to reduce power consumption. The nip width is set to a large value to enable efficient toner supply. The remaining toner adhering to the roller can be easily recovered to prevent staining of the image.

DESCRIPTION OF DRAWING(S) - The figure shows the lamination structure of the elastic rotary unit. (Drawing includes non-English language text).

Support 2

Elastic layer 3

Ultrathin stainless steel sleeve 4

Release layer 5

CHOSEN-DRAWING: Dwg.1/7

TITLE-TERMS: FIX ROLL COPY PRINT RELEASE LAYER FORMING STAINLESS STEEL SLEEVE

ARRANGE ELASTIC LAYER

DERWENT-CLASS: P84 Q62 S06

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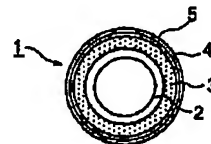
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(54) 【発明の名称】 弾性回転体およびそれを有する定着装置

(57) 【要約】

【解決課題】 プリンタや複写機等の画像形成装置（特にカラー機）に対する市場からの更なる高速化、高画質化の要求に対応して、加熱ローラ（又はベルト）と加圧ローラとが圧接する定着部で、トナーの溶融に必要な熱を十分に且つ速く、効率的に供給するための定着ニップ幅を大きく形成することを可能とする弾性回転体およびこれを有する定着装置を提供することを課題とする。

【解決手段】 支持体上に弾性体層を設け、当該弾性体層の上に厚さ0.03～0.15mmのステンレス等による極薄肉金属層を形成し、必要に応じて当該極薄肉金属層の表面に離型層を設けるように構成して課題を解決した。



1：弾性回転体、2：支持体、3：弾性体層、4：金属層、5：離型層。

【特許請求の範囲】

【請求項1】 支持体上に弾性体層を設け、当該弾性体層の上に厚さ0.03～0.15mmの極薄肉金属層を形成し、必要に応じて当該極薄肉金属層の表面に離型層を設けたことを特徴とする弾性回転体。

【請求項2】 上記極薄肉金属層としてシームレスステンレススリーブを用いたことを特徴とする請求項1に記載の弾性回転体。

【請求項3】 電子写真方式のプリンタや複写機等の画像形成装置において、被記録材上に形成されたトナー画像を加熱・熔融する加熱回転体又は被記録材の裏面より圧接する加圧回転体として、前記請求項1又は2のいずれかに記載の弾性回転体を用いたことを特徴とする定着装置。

【請求項4】 前記請求項3に記載の加熱回転体及び加圧回転体の両方の回転体として、前記請求項1又は2のいずれかに記載の弾性回転体を用いたことを特徴とする定着装置。

【請求項5】 電子写真方式のプリンタや複写機等の画像形成装置において、トナー画像定着時に被記録材の裏面より加圧する加圧回転体の表面に圧接して、当該加圧回転体の表面に付着したオフセットトナー等の付着物を回収するクリーニング部材として、前記請求項1又は2のいずれかに記載の弾性回転体を用いたことを特徴とする定着装置。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】この発明は、電子写真方式を採用したプリンタや複写機等の画像形成装置において、被記録材上に形成された未定着トナー像を加熱加圧することによって定着する定着装置の弾性回転体および当該弾性回転体を備えた定着装置に関するものである。

【0002】

【従来の技術】従来、上記電子写真方式を採用したプリンタや複写機等の画像形成装置において、画像形成工程の最終段階は、被記録材上に形成された未定着トナー像を、定着装置によって加熱・熔融し、被記録材上に定着して永久画像とする定着工程である。この定着工程を実施する定着方法としては、熱ローラ定着方式が長く一般的に用いられているが、最近の新しい機種では、省エネルギータイプで、ウェイト時間の短縮が可能なベルトニップ加熱定着方式も採用されており、注目を集めている。

【0003】上記熱ローラ定着方式を採用した定着装置は、基本的に、中空ローラの内部にハロゲンランプ等の発熱体を配設した加熱ローラと、当該加熱ローラに圧接させたシリコンゴム等の弾性体で形成された加圧ローラとから構成されている。この定着装置は、加熱ローラと加圧ローラとからなる一對のローラを互いに圧接させた状態で回転させて、当該一對のローラ間のニップ部

(圧接部)に未定着トナー像が形成された被記録材を通過させることにより、加熱ローラからの熱とニップ部の加圧力によって被記録材上にトナー画像を加熱熔融して定着させるものである。

【0004】これに対して、近年、エンドレスベルト状の回転体を介して、発熱体により被記録体上のトナー画像を加熱するベルトニップ加熱方式の定着装置が製品化されてきており、注目を集めている。このベルトニップ加熱方式の定着装置は、熱ローラ定着方式と比較して、薄肉のベルトを介するだけで回転体と発熱体とが一体となるため、実質的には、トナー画像を直接加熱することができ、加熱効率も良く、また加熱部を短時間で昇温することが可能となり、待ち時間も略ゼロとなる。また、定着部の必要な部分のみを加熱するため消費電力も少なく、省エネルギーの効果は大きいという特徴を有している。

【0005】

【発明が解決しようとする課題】しかしながら、上記従来技術の場合には、次のような問題点を有している。すなわち、上記熱ローラ定着方式を採用した定着装置の場合には、加熱ローラ自体が中空・厚肉金属ローラのために熱容量が比較的大きく、またローラ内部の発熱体から空気を介して加熱するため、加熱ローラが冷えた状態の時には、加熱ローラ全体を所定の温度まで昇温させるのに長い加熱時間が必要となり、電源投入時からの待ち時間が長くなるばかりか、消費電力も大きくなり、省エネルギー上問題点を有している。

【0006】また、上記熱ローラ定着方式を採用した定着装置の場合には、加熱ローラは金属製やガラス、セラミック製のために表面は硬く、また一方の加圧ローラもシリコンゴム等によって形成されているために、十分なニップ幅を得ることができず、特にフルカラーのトナー画像を定着する場合など、高速化するにも限界があるという問題点を有している。

【0007】一方、上記ベルトニップ加熱方式の定着装置の場合には、エンドレスベルトの材質として、ポリイミド等の合成樹脂系と、電鍍工法により製造されたニッケル等の金属系のものがあるが、何れも高価な材質であり、また前者は熱伝導性、後者は耐熱性等の基本性能の上でも問題が多いのが現状である。

【0008】また、このベルトニップ加熱方式の定着装置も、発熱体による加熱方式を採用しているため、周囲への放熱量も多く、十分な定着性を得るためには、必要以上に高い温度に設定し、被記録材が圧接されたローラ間を通過する時間を長く設定して、定着時間を充分にとる必要がある。

【0009】近年、電子写真方式のプリンタや複写機等の画像形成装置(特にカラー機)に要求されている更なる高速化や高画質化に対応する定着性の向上には、被記録材のローラ間の通過時間すなわち加熱・加圧時間を短

縮させる必要があり、省エネルギー化に反して温度を大幅に上昇させるか、または加熱、加圧両ローラ間に形成される圧接ニップ幅を大きくする必要が生じてくる。

【0010】さらに、定着時の問題となる別の不具合は、被記録材から圧着されなかった未定着トナーの一部が、加熱ローラ（又はベルト）や加圧ローラに転移付着するいわゆるオフセット現象が発生し、繰り返して回転する度に順次ニップ部を通過していく被記録材に熱転写され、当該被記録材の表面に斑点状の汚れが発生する。この汚れを防止するためには、加圧ローラにクリーニング部材を設ける例があるが、確実な防止はできていないのが現状である。

【0011】そこで、この発明は、上記従来技術の問題点を解決するためになされたものであり、その第一の目的とするところは、プリンタや複写機等の画像形成装置（特にカラー機）に対する市場からの更なる高速化、高画質化の要求に対応して、加熱ローラ（又はベルト）と加圧ローラとが圧接する定着部で、トナーの溶融に必要な熱を充分に供給するためのニップ幅を大きく形成することを可能とする弾性回転体の提供と、また該弾性回転体を適用することにより、ニップ部において温度分布及び圧力の均一性が確保されて確実な定着性が得られ、高画質化を実現できる定着装置の提供、さらにまた必要とする定着温度までの昇温速度が速く、電源投入時からの待ち時間が短い省消費電力型の定着装置を提供することにある。

【0012】さらに、この発明の第二の目的とするところは、従来の薄肉金属製ベルトを用いたベルトニップ方式の長所を生かしながら、ベルトの蛇行やたわみ等薄肉ベルトに起因する定着不具合の解決を図るとともに、シンプルな装置構成となり、コンパクト化、省スペース化を可能にして、ローラの耐久性やメンテナンス性等が優れて且つ低コスト化が可能な定着装置を提供することにある。

【0013】

【課題を解決するための手段】上記の目的を達成するため、請求項1に記載された発明は、支持体上に弾性体層を設け、当該弾性体層の上に厚さ0.03～0.15mmの極薄肉金属層を形成し、必要に応じて当該極薄肉金属層の表面に離型層を設けたことを特徴とし、これにより定着部に大きなニップ幅を形成して定着の高速化及び高画質化等の性能向上に対応できる弾性回転体を提供するものである。

【0014】ここで、上記支持体としては、例えば、金属又は合成樹脂等で形成されたチューブ状又はシャフト状のものが用いられる。

【0015】また、上記弾性体層としては、例えば、ゴム又は合成樹脂系の発泡材や、ゴム及び合成樹脂の共重合体からなる弾性体等からなるものが用いられる。

【0016】さらに、上記極薄肉金属層の厚さは、0.

03～0.15mmに設定されるが、望ましくは0.05mm以下に設定される。

【0017】また更に、上記離型層としては、例えば、フッ素樹脂等の離型材からなるものが用いられる。

【0018】ところで、薄肉の金属層を弾性体層の上に積層してなる回転体に関する技術としては、例えば、特開平10-340023号公報に開示されているものが、すでに提案されている。上記特開平10-340023号公報の特許請求の範囲に記載された内容は、「少なくとも芯金と弾性を有する材料からなる弾性体層と、金属からなる金属層と、離型性を有する材料からなる離型層とを、この順番に順次積層して一体化してなるローラと、該ローラと一部で圧接した押圧部材と、前記ローラを加熱する加熱手段を有することを特徴とする加熱装置」である。上記内容の金属については、材料は、Ni、SUS、Alなどが比較的安価で加工しやすく好ましいとされ、またその厚さは0.02～0.5mmの厚さが好ましいとされている。また、該ローラの加工方法としては、具体的にシームレスのベルトを電鍍などの方法で形成したものとされている。さらにはシームレスの金属ベルトは高価なため、シート状の金属箔を巻付ける方法が比較的容易に製作できてコストが安く好ましいと提案されている。

【0019】しかしながら、上記特開平10-340023号公報に開示されたローラは、加熱手段であり、ローラ外表面より内部への熱放射を抑えて、昇温効率を上げる等加熱時の不具合解決のみを目的としたもので、定着装置に係る高速化、高画質化等の性能向上要求に対応しようという目的ではない。

【0020】これに対し、この発明は、極く薄肉金属よりなる表面金属層（特にシームレスステンレス層）が備える特長である……

1. 高剛性／曲げ応力小
2. バネ性／弾性変形
3. 板厚均一性
4. 軽量
5. 耐久性・耐食性・耐磨耗性／発塵なし
6. 耐熱性
7. 熱伝導性／温度分布の均一性
8. 熱容量小
9. 導電性
10. 磁性
11. 表面平滑性
12. 表面加工性（孔開け・微細加工等）等

と、またゴム又は合成樹脂系の発泡材等よりなる弾性体層が備えた特長である……

1. 弾力性
2. 成形性
3. 断熱性
4. 絶縁性（不導体）

5. 軽量

等

【0021】表面の極薄肉の金属層と内部の弾性体層双方の特長を生かして構成した回転体であり、加熱手段や加圧手段だけでなく他の手段、例えばクリーニング部材等として使用することも可能であり、プリンタや複写機等の定着高速化、高画質化対策を実現できる汎用可能な弾性回転体を提供するものである。

【0022】また、請求項2に記載された発明は、極薄肉金属層としてシームレスステンレススリーブを用いたことを特徴とし、金属層を薄肉の丸めて両端を溶接により形成された金属スリーブを用いた場合に、金属層にできた溶接箇所の継ぎ目に起因して発生する定着不具合を回避し、定着性等の一層の性能向上を図るものである。さらに、ステンレス材は耐熱性、加工性も高く、低コストであり、本発明の材質として最適である。尚、請求項1に記載された発明において、金属層に板厚0.05mmレベルの溶接スリーブを使用すると、溶接継ぎ目の個所での耐久性が極端に悪くなり、ローラの寿命は大きく低下する。

【0023】さらに、請求項3に記載された発明は、電子写真方式のプリンタや複写機等の画像形成装置において、被記録材上に形成されたトナー画像を加熱・溶融する加熱回転体又は被記録材の裏面より圧接する加圧回転体として、前記請求項1又は2のいずれかに記載の弾性回転体を用いたことを特徴とし、以って定着部のニップ幅を大きくし、定着に必用な温度と圧力の保持等を可能にして高速回転でも確実な定着が得られる定着装置を提供するものである。

【0024】又、請求項4に記載された発明は、前記請求項3に記載の加熱回転体及び加圧回転体の両方の回転体として、前記請求項1又は2のいずれかに記載の弾性回転体を用いたことを特徴とし、これにより定着部に安定した大きなニップ幅を形成することが可能となり、定着に必用な温度と圧力の保持等が充分となり、高速回転でも確実な定着が得られる定着装置を提供するものである。

【0025】更に、請求項5に記載された発明は、電子写真方式のプリンタや複写機等の画像形成装置において、トナー画像定着時に被記録材の裏面より加圧する加圧回転体の表面に圧接して、当該加圧回転体の表面に付着したオフセットトナー等の付着物を回収するクリーニング部材として、前記請求項1又は2のいずれかに記載の弾性回転体を用いたことを特徴とし、以って加圧回転体のトナー汚れに起因する被記録材の斑点汚れを防止し、常に良好な定着画像が得られる定着装置を提供するものである。

【0026】なお、この請求項5に記載された発明において、クリーニング部材として、請求項1又は2のいずれかに記載の弾性回転体を用いる場合には、当該弾性回転体の表面には、離型層を設けることなく、極薄肉金属

層が表面に露出した状態とする必要がある。

【0027】

【発明の実施の形態】以下に、この発明の実施の形態について図面を参照して説明する。

【0028】実施の形態1

図1は、この発明の実施の形態1に係る薄肉金属被覆の弾性回転体の一例を示す積層構造説明図である。

【0029】図1において、1は定着装置の加熱ローラ等として使用される弾性回転体を示すものであり、この弾性回転体1は、金属又は耐熱性の合成樹脂等で形成されたチューブ状又はシャフト状（図示例では、チューブ状）の支持体2上に、ゴムや合成樹脂系のバルク材や発泡材、例えばシリコンゴム等からなる厚さ3～8mmの弾性体層3を被覆し、その上に金属例えばステンレス、鉄等を厚さ0.03～0.15mm、望ましくは0.05mm以下に薄肉化して形成されたスリーブからなる金属層4を積層し、必要に応じて当該金属層4の表面にフッ素樹脂等の離型材よりなる離型層5を設けて構成されている。

【0030】次に、上記弾性回転体1の製造方法について説明する。この弾性回転体1は、図1に示すように、金属層4としての金属製のスリーブの内部に、支持体2の上に弾性体層3を形成したものを挿入するか、または金属スリーブ4の中心部に支持体2を配置し、金属製スリーブ4と支持体2の間に、未硬化状態のシリコンゴム等からなる流動状の発泡材を充填し、当該流動状の発泡材を硬化させて弾性体層3とする方法が挙げられる。

【0031】金属製スリーブ4は、軸線方向に溶接等の継ぎ目がないシームレススリーブが好ましく、溶接継ぎ目のある金属スリーブは、前述したように、耐久性が低く適当ではない。また、この金属製スリーブ4の材質としては、上述した中でもとりわけ剛性、バネ性および耐久性等に優れ、低コストで加工が可能なステンレス製のスリーブが最適である。

【0032】実施の形態2

図2はこの発明の実施の形態2を示すものであり、前記実施の形態1と同一の部分には同一の符号を付して説明すると、この実施の形態2では、電子写真方式のプリンタや複写機等の画像形成装置において、被記録材上に形成されたトナー画像を加熱・溶融する加熱回転体又は被記録材の裏面より圧接する加圧回転体として、支持体上に弾性体層を設け、当該弾性体層の上に厚さ0.03～0.15mmの極薄肉金属層を形成し、必要に応じて当該極薄肉金属層の表面に離型層を設けたことを特徴とする弾性回転体か、又は上記極薄肉金属層としてシームレスステンレススリーブを用いたことを特徴とする弾性回転体を用いるように構成されている。

【0033】図2は、この発明の実施の形態2に係る薄肉金属被覆の弾性回転体を、加熱ローラとして適用した定着装置を示す概略構成図である。

【0034】上記定着装置が装着された電子写真方式のプリンタや複写機等の画像形成装置においては、公知の画像形成プロセスを用いて、記録用紙等の被記録材11上にトナー画像12が形成され、このトナー画像12が形成された被記録材11は、画像形成プロセスの最終段階で、本発明の薄肉金属被覆の弾性回転体が加熱ローラとして適用された定着装置13に搬送される。

【0035】この定着装置13は、図2に示すように、上記実施の形態1と同様に形成された弾性回転体としての加熱ローラ14と、金属又は耐熱性の合成樹脂等で形成された円筒状の支持体上に、ゴムや合成樹脂系の発泡材、例えばシリコンゴム等からなる弾性体層を比較的厚く被覆してなる加圧ローラ15とを互いに圧接させ、両ローラ14、15間のニップ部16に、トナー画像12が形成された被記録材11を通過させるように構成されている。上記加熱ローラ14を加熱する方式としては、例えば、当該加熱ローラの圧接ニップ部の上流側近傍に発熱体17を配設し、この発熱体17によって加熱ローラ14の表面を直接加熱する方式と、不図示の磁場発生手段により磁界を発生させ渦電流を生じさせて、ジュール熱により加熱ローラ14を直接発熱させる磁気誘導加熱方式とがあるが、何れの方式であっても本発明の薄肉金属被覆の弾性回転体としての加熱ローラ14は、表面被覆の金属層4がステンレス等の金属からなり、しかも極薄肉であるため、熱伝導性も良く熱容量も小さいので、熱効率の良い加熱ローラとして好適である。

【0036】近年、益々激化するプリンタや複写機等の画像形成装置の高速化、高画質化競争に伴い、定着の高速化や定着性の向上が求められているが、中でも高速化のためには、被記録材の定着部での通過時間を短縮する必要がある。そのためには、定着に必要な熱量をニップ部に充分供給することと、均一な定着圧力の保持のために圧接ニップ幅を大きくする工夫が必要となるが、本発明によれば、加熱ローラの表面を被覆する極く薄肉金属の熱伝導性、剛性とバネ性および弾性体層の適正な弾力性により、定着に必要な温度および圧力を保持できる充分なニップ幅の確保を実現し、定着の高速化と同時に定着性の向上、安定化を可能にすることができる。その他表面弾力性によりニップ幅を大きくすることができるので、加熱ローラ等を小径化して装置をコンパクトにすることが可能となり、シンプルな構造と共に定着装置の省スペース化を実現する効果も生まれる。

【0037】その他の構成及び作用は、前記実施の形態1と同様であるので、その説明を省略する。

【0038】実施の形態3

図3はこの発明の実施の形態3を示すものであり、前記実施の形態と同一の部分には同一の符号を付して説明すると、この実施の形態3では、薄肉金属被覆の弾性回転体を、加圧ローラとして用いるように構成されている。

【0039】図3は、この発明の実施の形態3に係る薄

肉金属被覆の弾性回転体を、加圧ローラとして適用した定着装置を示す概略構成図である。

【0040】図3(a)(b)および(c)は駆動および張力の機能を持つ二つのローラ21、22に懸回されたエンドレスベルト23を用いたエンドレスベルト式の加熱回転体を備えた定着装置、また図3(d)はローラ式または中空ベルト式の加熱回転体を備えた定着装置を示す。尚、図3(a)において、25はエンドレスベルト23を介して加圧ローラ24の表面に圧接する発熱体を示すものである。

【0041】前記実施の形態2と同様に、被記録材11の上に形成されたトナー画像12を加熱回転体23により加熱・溶融し、同時に裏面より圧接された本発明品である薄肉金属被覆の弾性回転体を適用した加圧ローラ24により押圧して、トナー画像を定着画像とする。図3(a)(b)(c)および(d)の何れの方式の加熱回転体であっても本発明品である薄肉金属被覆の弾性回転体を適用した加圧ローラ24はセット対応が可能であり、加圧ローラ24の表面を被覆する極薄肉金属の剛性とバネ性および弾性体層の適正な弾力性により、定着に必要な温度および圧力を保持できる充分なニップ幅の確保を実現し、定着の高速化と同時に定着性の向上を可能にして高画質化を実現することができる。

【0042】上記加圧ローラ24の層構成は、基本的に、図1に示す加熱ローラと同様であるが、当該弾性回転体を加圧ローラ24として用いる場合には、加熱ローラと異なり加圧を目的とするため、支持体の肉厚や直径を加熱ローラよりも大きく設定するとともに、弾性体層の肉厚を薄く設定し、更に、金属層の肉厚を厚く設定するのが望ましい。

【0043】尚、従来のシリコンゴム等により製造された加圧ローラと比較すると、本発明品は極く薄肉金属層が有する何れも高い剛性、バネ性、熱伝導性および表面平滑性等により適正なニップ部を形成することが可能となり、ニップ部での定着性の向上が実現できる。その他、ローラ径を小径化して装置をコンパクトにすることが可能になり、シンプルな構造と共に定着装置の省スペース化を可能とする効果も生まれる。さらに、必要に応じて発熱方式を選ぶことにより、補助加熱体としての機能を持たせることもできるので、ニップ部近傍の温度管理を高度に実施することにより、ハイレベルな省消費電力化を可能とする。尚、さらに金属層の残熱により加圧ローラに転移付着したオフセットトナーを加圧ローラ上で軟化させることができ、クリーニング部材により剥離し回収し易くなる。

【0044】その他の構成及び作用は、前記実施の形態1と同様であるので、その説明を省略する。

【0045】実施の形態4

図4はこの発明の実施の形態4を示すものであり、前記実施の形態と同一の部分には同一の符号を付して説明す

ると、この実施の形態4では、加熱回転体及び加圧回転体の両方の回転体として、支持体上に弾性体層を設け、当該弾性体層の上に厚さ0.03~0.15mmの極薄肉金属層を形成し、必要に応じて当該極薄肉金属層の表面に離型層を設けたことを特徴とする弾性回転体か、又は上記極薄肉金属層としてシームレスステンレススリーブを用いたことを特徴とする弾性回転体を用いるように構成されている。

【0046】図4は、この発明の実施の形態4に係る薄肉金属被覆の弾性回転体を、加熱ローラ及び加圧ローラとして適用した定着装置を示す概略構成図である。

【0047】上記定着装置が装着された電子写真方式のプリンタや複写機等の画像形成装置において、画像形成の最終段階にて被記録材31の上に形成されたトナー画像32を本発明品である薄肉金属被覆の弾性回転体を適用した加熱ローラ33により加熱・熔融し、同時に被記録材31の裏面より本発明品である薄肉金属被覆の弾性回転体を適用した加圧ローラ34により押圧されてトナー画像32を定着画像とする定着装置を示したものである。本発明は、前記実施の形態2に係る加熱ローラと、前記実施の形態3に係る加圧ローラの両方を備えたことを特徴とする構造であり、プリンタや複写機等の画像形成装置の高速化および高画質化の要求に対応して、高速かつ高い定着性を可能とする定着装置を実現することができる。また、最もシンプルな構造となるためメンテナンス性は高く、且つまた金属層が極く薄肉のためローラの小径化も可能となり、コンパクトで省スペースとなる定着装置を提供することができる。

【0048】その他の構成及び作用は、前記実施の形態1と同様であるので、その説明を省略する。

【0049】実施の形態5

図5はこの発明の実施の形態5を示すものであり、前記実施の形態と同一の部分には同一の符号を付して説明すると、この実施の形態5では、電子写真方式のプリンタや複写機等の画像形成装置において、トナー画像定着時に被記録材の裏面より加圧する加圧回転体の表面に圧接して、当該加圧回転体の表面に付着したオフセットトナー等の付着物を回収するクリーニング部材として、支持体上に弾性体層を設け、当該弾性体層の上に厚さ0.03~0.15mmの極薄肉金属層を形成し、必要に応じて当該極薄肉金属層の表面に離型層を設けたことを特徴とする弾性回転体か、又は上記極薄肉金属層としてシームレスステンレススリーブを用いたことを特徴とする弾性回転体を用いるように構成されている。

【0050】図5は、この発明の実施の形態5に係る薄肉金属被覆の弾性回転体を、加圧ローラのクリーニング部材として適用した定着装置を示す概略構成図である。尚、本図は、加圧ローラのクリーニング部材を例に説明するが、他のローラ等の回転体に圧接してクリーニング部材として適用できることは勿論である。

【0051】定着装置において被記録材41の上にあるトナー画像42が、加熱ローラ43と加圧ローラ44により圧接されたニップ部を通過する際に、被記録材41に何らかの不具合で定着されなかった微量のトナーが、加熱ローラ43側に転移したいわゆるオフセットトナーが、加圧ローラ44に転移・付着して、後続してニップ部を通過する被記録材41に転移して、被記録材41の表面に斑点状の汚れが発生することが多い。

【0052】このような加圧ローラ44に付着したオフセットトナーを回収し、被記録材41に発生する斑点状の汚れを防止するために、クリーニング部材を備える定着装置の提案もあるが、従来のシリコンゴム材による加圧ローラでは付着したトナーが軟化変形せず、クリーニング部材による回収率は悪く、斑点状の汚れ発生を確実に防止することは困難である。

【0053】そこで、本発明の薄肉金属被覆の弾性回転体を、加圧ローラ44に圧接してクリーニング部材45として使用することにより、金属層に残る熱によってトナーは軟化した状態となり、尚且つ表面の弾力性により接触面積が増えるため、加圧ローラ44表面に付着したトナーを確実に回収することができる。

【0054】実施の形態6

図6はこの発明の実施の形態6を示すものであり、前記実施の形態と同一の部分には同一の符号を付して説明すると、この実施の形態6では、弾性回転体に使用される金属層として、塑性加工が可能な金属からなる円筒状素管を、薄肉化処理により所定の肉厚まで薄肉化したものを用いたものである。

【0055】また、上記弾性回転体に使用される金属層としては、塑性加工が可能な金属からなる軸線方向に継ぎ目のない円筒状素管を、薄肉化処理により所定の肉厚まで薄肉化したものを用いても良い。

【0056】さらに、上記弾性回転体に使用される金属層は、例えば、塑性加工が可能な金属製の板材にプレス加工を施すことによりカップ状素管を形成するプレス工程と、前記金属製カップ状素管の円筒状部をしごき加工することにより、所定の肉厚まで薄肉化する薄肉化工程とによって製造される。

【0057】また更に、上記弾性回転体に使用される金属層は、例えば、塑性加工が可能な金属からなる円筒状素管を軸線の周りに回転させた状態で、当該円筒状素管の外周壁に絞り加工を施すことにより、所定の肉厚まで薄肉化する薄肉化工程と、前記薄肉化工程の前後又は途中に少なくとも1回以上行なわれ、前記金属製カップ状素管の少なくとも円筒状部を焼鈍処理する焼鈍工程とによって製造しても良い。

【0058】さらに、上記弾性回転体に使用される金属層は、例えば、塑性加工が可能な金属からなる円筒状素管を引抜き加工することにより、所定の肉厚まで薄肉化する薄肉化工程によって製造しても良い。

【0059】又さらに、上記弾性回転体に使用される金属層は、例えば、塑性加工が可能な金属からなる円筒状素管をバネ加工機の内部に挿入し、当該円筒状素管に対してその内部より圧力を加えて加工処理加工することにより、所定の肉厚まで薄肉化する薄肉化工程によって製造しても良い。

【0060】次に、この発明の実施の形態6に係る金属製スリーブの製造方法について、具体的に説明する。

【0061】工程1

まず、図6(a)に示すように、金属製スリーブ4の素材となる平板状の金属板121を用意する。この平板状の金属板121は、その板厚が例えば0.1~1mm程度に設定される。この金属製スリーブ4の材質としては、塑性加工が可能な金属材料であれば、任意の材質のものをを用いることができるが、中でも特に延性が高く、加工硬化により弾性が向上するSUS、Ni合金、Ti合金、Al合金、Cu合金、Fe等を用いるのが望ましい。この実施の形態1では、金属製無端ベルト8、11の材質としてSUSを用いている。中でもSUS304が好ましい。

【0062】上記平板状の金属板121は、図6(a)に示すように、深絞り機の上型123と下型122を用いたプレス加工によって深絞りが行なわれ、図6(b)に示すようなカップ形状の円筒状素管124が形成される。このカップ形状の円筒状素管24の望ましい板厚は、0.1~0.15mmであるが、これ以外の板厚であっても良い。

【0063】工程2

その後、円筒状素管124を、図6(c)に示すように、しごき加工機125の円筒状の内型126に嵌合した状態で装着し、外径の異なる複数の外型127を外部に配置する。そして、上記しごき加工機125の内型126を、矢印A方向に沿って移動させるとともに、2~3段のしごき加工を行ない、図6(d)に示すように、円筒状素管124を厚さ約0.03~0.05mm程度に極く薄肉化しつ長尺化する。尚、外型・内型のどちらか一方または両方を回転させるケースも考えられる。

【0064】このようにして製造された金属製スリーブ4は、厚さムラもなく、形状は歪みのない真円となり、高精度な回転体の金属層として使用できる。

【0065】実施の形態7

図7はこの発明の実施の形態7を示すものであり、この実施の形態7に係る金属製スリーブの製造方法は、塑性加工が可能な金属からなる円筒状素管を軸線の周りに回転させた状態で、当該円筒状素管の外周壁に絞り加工を施すことにより、所定の肉厚まで薄肉化する薄肉化工程とを具備するように構成したものである。

【0066】次に、この発明の実施の形態7に係る金属製スリーブの製造方法について、具体的に説明する。

【0067】工程1

まず、図7(a)に示すように、塑性加工が可能な金属材料からなる円筒状素管131を形成する。この円筒状素管131は、図示しない平板状の金属板を円筒状に丸め、その両端部をレーザービーム溶接等によって溶接した溶接パイプであっても、前記実施の形態1と同様に軸線方向に継ぎ目がないように形成したシームレスパイプであっても良いが、軸線方向に継ぎ目がないシームレスパイプを用いるのが望ましい。

【0068】工程2

次に、上記円筒状素管131は、図7(b)に示すように、スピニング機132の回転軸133の先端に嵌め込まれた状態で、回転駆動される。そして、回転している円筒状素管131の外周壁に外圧ローラ134を接触させて、均一に押し付け、矢印B方向に移動させる。こうすることによって、外圧ローラ134により円筒状素管131の周壁が絞られ、薄肉化かつ長尺化される。このスピニング加工により図7(c)に示す肉厚が約0.03~0.15mmの薄肉金属スリーブ35を形成する。

20 【0069】工程3

必要に応じて、薄肉化工程の前後または途中で、円筒状素管31に対して加工性を向上するために、内部応力を除去する等の目的で焼鈍処理を行う。しかる後、上記の如く薄肉化かつ長尺化された薄肉金属スリーブ35を得ることにより、薄肉金属無端シームレススリーブ4を製造する。

【0070】このようにして製造された金属製スリーブ4は、厚さムラもなく、形状は歪みのない真円となり、高精度な高精度な回転体の金属層として使用できる。

30 【0071】その他の構成及び作用は、前記実施の形態1と同様であるので、その説明を省略する。

【0072】

【発明の効果】以上のように、この発明によれば、電子写真方式のプリンタや複写機等の画像形成装置において、近年益々激化する性能競争、特にフルカラー化、高画質化、高速化および省消費電力化等の要求に応える定着装置を提供することが可能となる。

【0073】厚さ0.03~0.5mm、望ましくは0.05mm以下の極く薄肉金属とりわけステンレス等による金属層の下に、シリコンゴム等の弾性体層を形成してなる本発明の薄肉金属被覆の弾性回転体を、定着装置の加熱体又は加圧体の一方の回転体、あるいは加熱体と加圧体両方の回転体として適用すると、表面の極く薄肉のステンレススリーブが持つ高いバネ性(弾性)、剛性と表面平滑性等によって可能となる大きなニップ幅を定着部に形成することができ、被記録材の定着ニップ部での通過時間を長くし、且つ表面層のステンレスが持つ熱伝導性を利用して最も有効となる加熱方式を選択することにより、定着に要する所定の温度の安定保持、ニップ部の温度分布及び圧力分布の均一化等が可能となり

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定着の高速化、同時に定着性の向上を達成することができる。また、加熱時間の少ない省消費電力型の定着装置を実現することができる。

【0074】尚、定着装置としての構造はシンプルになる上に、高剛性、耐磨耗性の金属被覆のためローラは長寿命となり、メンテナンス性は高く、且つ表面の弾力性によりニップ幅がとれるため、ローラの小径化も可能となり、装置のコンパクト化、省スペース化および省資源化を実現することができる。

【0075】さらに、この発明の薄肉金属被覆の弾性回転体を装置内部にある回転体のクリーニング部材として適用すれば、回転体に付着したオフセットトナーを確実に回収することができ、被記録材にオフセットトナーが転移付着して発生する画像汚れを防止することが可能となる。

【図面の簡単な説明】

【図1】 図1はこの発明の実施の形態1に係る薄肉金属被覆の弾性回転体の一例を示す積層構造説明図である。

【図2】 図2はこの発明の実施の形態2に係る薄肉金

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属被覆の弾性回転体を加熱ローラとした定着装置を示す概略説明図である。

【図3】 図3はこの発明の実施の形態3に係る薄肉金属被覆の弾性回転体を加圧ローラとした定着装置を示す概略説明図である。

【図4】 図4はこの発明の実施の形態4に係る薄肉金属被覆の弾性回転体を加熱ローラ及び加圧ローラとした定着装置を示す概略説明図である。

【図5】 図5はこの発明の実施の形態5に係る薄肉金属被覆の弾性回転体をクリーニング部材とした定着装置を示す概略説明図である。

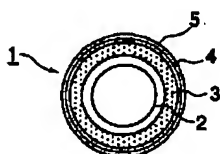
【図6】 図6(a)～(d)はこの発明の実施の形態6に係る金属製スリーブの製造方法の製造工程をそれぞれ示す構成図である。

【図7】 図7(a)～(c)はこの発明の実施の形態7に係る金属製スリーブの製造方法の製造工程をそれぞれ示す構成図である。

【符号の説明】

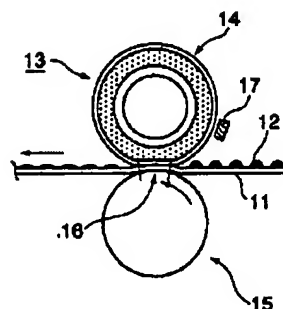
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【図1】

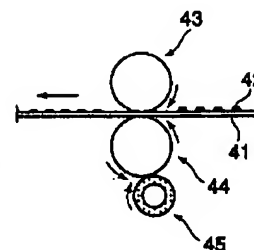


1：弾性回転体、2：支持体、3：弾性体層、4：金属層、5：離型層。

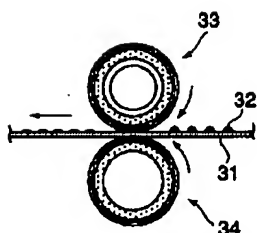
【図2】



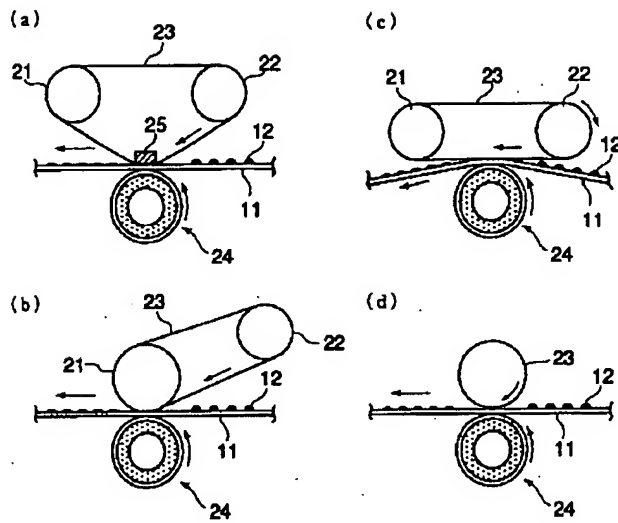
【図5】



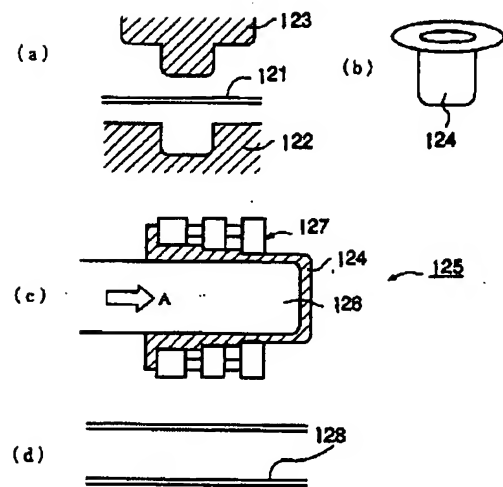
【図4】



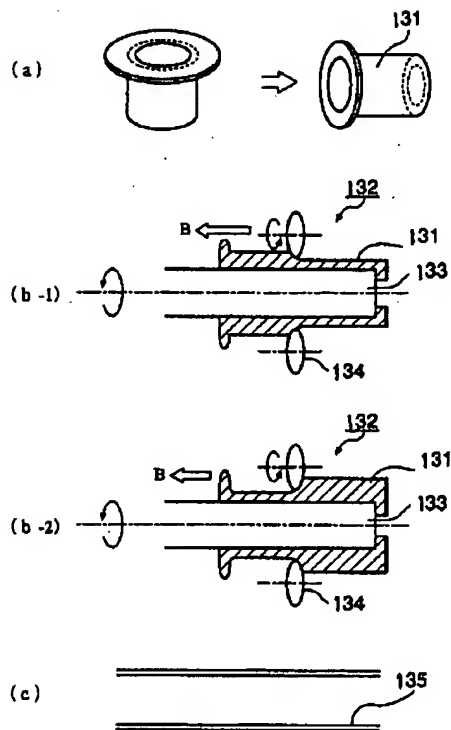
【図3】



【図6】



【図7】



フロントページの続き

Fターム(参考) 2H033 AA23 AA30 AA32 BA49 BA54
BA55 BB04 BB14 BB29 BB30
BB33
3J103 AA02 AA14 AA15 AA33 AA41
AA51 AA69 AA72 BA02 BA17
BA31 BA41 FA01 FA02 FA07
FA12 FA16 FA18 FA19 FA20
GA02 GA52 GA57 GA58 GA64
GA68 HA01 HA03 HA04 HA05
HA11 HA12 HA15 HA18 HA31
HA32 HA33 HA41 HA53

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3. In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] Drawing 1 is the laminated-structure explanatory view showing an example of the elastic body of revolution of light-gage metallic coating concerning the gestalt 1 of implementation of this invention.

[Drawing 2] Drawing 2 is the approximate account Fig. showing the anchorage device which used elastic body of revolution of light-gage metallic coating concerning the gestalt 2 of implementation of this invention as the heating roller.

[Drawing 3] Drawing 3 is the approximate account Fig. showing the anchorage device which used elastic body of revolution of light-gage metallic coating concerning the gestalt 3 of implementation of this invention as the pressurization roller.

[Drawing 4] Drawing 4 is the approximate account Fig. showing the anchorage device which used elastic body of revolution of light-gage metallic coating concerning the gestalt 4 of implementation of this invention as the heating roller and the pressurization roller.

[Drawing 5] Drawing 5 is the approximate account Fig. showing the anchorage device which used elastic body of revolution of light-gage metallic coating concerning the gestalt 5 of implementation of this invention as the cleaning member.

[Drawing 6] Drawing 6 (a) - (d) is the block diagram showing the production process of the manufacture approach of the metal sleeve concerning the gestalt 6 of implementation of this invention, respectively.

[Drawing 7] Drawing 7 (a) - (c) is the block diagram showing the production process of the manufacture approach of the metal sleeve concerning the gestalt 7 of implementation of this invention, respectively.

[Description of Notations]

1: Elastic body of revolution, 2: base material, 3: elastic body layer, 4: metal layers, 5 : mold release layer.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the anchorage device equipped with the elastic body of revolution and the elastic body of revolution concerned of the anchorage device established by carrying out heating pressurization of the non-established toner image formed on the recorded material in image formation equipments which adopted the electrophotography method, such as a printer and a copying machine.

[0002]

[Description of the Prior Art] Conventionally, in image formation equipments which adopted the above-mentioned electrophotography method, such as a printer and a copying machine, the culmination of an image formation process is a fixing process which heats and fuses, is established on a recorded material and uses as a permanent image the non-established toner image formed on the recorded material with an anchorage device. As the fixing approach of carrying out this fixing process, although the heat roller fixing method is generally used for a long time, from the latest new model, it is an energy-saving type, and the belt nip heating fixing method which can shorten weight time amount is also adopted, and attention is attracted.

[0003] The anchorage device which adopted the above-mentioned heat roller fixing method consists of a heating roller which arranged heating elements, such as a halogen lamp, in the interior of a hollow roller, and a pressurization roller formed with elastic bodies, such as silicone rubber which carried out the pressure welding to the heating roller concerned, fundamentally. By rotating the roller of a pair which consists of a heating roller and a pressurization roller, where a pressure welding is carried out mutually, and passing the recorded material with which the non-established toner image was formed in the nip section between the rollers of the pair concerned (pressure-welding section), on a recorded material, this anchorage device carries out heating fusion, and fixes a toner image with the welding pressure of the heat from a heating roller, and the nip section.

[0004] On the other hand, the anchorage device of the belt nip heating method which heats the toner image on the recorded body with a heating element is produced commercially through endless-belt-like body of revolution, and attention is attracted in recent years. Since body of revolution and a heating element are united only by minding the belt of thin meat as compared with a heat roller fixing method, substantially, a toner image can be heated directly, and heating effectiveness is good, and it becomes possible to carry out the temperature up of the heating unit for a short time, and, as for the anchorage device of this belt nip heating method, the latency time also serves as abbreviation zero. Moreover, in order to heat only the required part of the fixing section, there is also little power consumption, and it has the description that the effectiveness of energy saving is large.

[0005]

[Problem(s) to be Solved by the Invention] However, in the case of the above-mentioned conventional technique, it has the following troubles. That is, the heating roller itself has comparatively large heat capacity because of hollow and a heavy-gage metal roller, and long heating time is needed for carrying

out the temperature up of the whole heating roller to predetermined temperature, and in order to heat through air from the heating element inside a roller, when it is in the condition in which the heating roller got cold, about [that the latency time from a power up becomes long] and power consumption also becomes large, and, in the case of the anchorage device which adopted the above-mentioned heat roller fixing method, has the energy-saving top trouble.

[0006] Moreover, in the case of the anchorage device which adopted the above-mentioned heat roller fixing method, the front face of a heating roller is hard because of metal or the product made from glass and a ceramic, and since one pressurization roller is also formed with silicone rubber etc., when sufficient nip width of face cannot be obtained but a full color toner image is established especially, it has the trouble that there is a limitation also in accelerating.

[0007] On the other hand, in the case of the anchorage device of the above-mentioned belt nip heating method, there are synthetic-resin systems, such as polyimide, and a thing of metal systems, such as nickel manufactured by the electrocasting method of construction, as the quality of the material of an endless belt, but all are the expensive quality of the materials, and, as for the present condition, there are [the former / thermal conductivity and the latter] many problems also on fundamentality ability, such as thermal resistance.

[0008] Moreover, since the heating method by the heating element is adopted, there is also much heat release to a perimeter, it is necessary to set it as temperature high beyond the need, and to set up the time amount which passes through between the rollers with which the pressure welding of the recorded material was carried out for a long time, and the anchorage device of this belt nip heating method also fully needs to take fixing time amount, in order to acquire fixable [sufficient].

[0009] In recent years, it will be necessary to make fixable improvement corresponding to the further improvement in the speed and the further high-definition-izing which are demanded of image formation equipments (especially color machine), such as a printer of an electrophotography method, and a copying machine, shorten the pass time between the rollers of a recorded material, i.e., heating / pressurization time amount, and to enlarge pressure-welding nip width of face which temperature is sharply raised against energy saving, or is formed among heating and pressurization both rollers.

[0010] Furthermore, hot printing of some non-established toners which were not stuck by pressure from a recorded material is carried out to the recorded material which passes the nip section one by one whenever the so-called offset phenomenon which carries out transition adhesion occurs and rotates repeatedly on a heating roller (or belt) or a pressurization roller, and punctate dirt generates another fault which poses a problem at the time of fixing on the front face of the recorded material concerned.

Although the example which prepares a cleaning member is in a pressurization roller in order to prevent this dirt, the present condition is have not performed positive prevention.

[0011] Then, the place which it is made in order that this invention may solve the trouble of the above-mentioned conventional technique, and is made into that first purpose Corresponding to the demand of the further improvement in the speed from the commercial scene over image formation equipments (especially color machine), such as a printer and a copying machine, and high-definition-izing, in the fixing section in which a heating roller (or belt) and a pressurization roller carry out a pressure welding With offer of the elastic body of revolution which makes it possible to form greatly the nip width of face for fully supplying heat required for melting of a toner, moreover, by applying this elastic body of revolution Offer of the anchorage device which the homogeneity of temperature distribution and a pressure is secured in the nip section, and fixable [positive] is acquired, and can realize high definition-ization, and the programming rate to the fixing temperature needed further again are quick, and the latency time from a power up is to offer the anchorage device of a short electrical-power-consumption-saving mold.

[0012] Furthermore, the place made into the second purpose of this invention is for endurance, maintenance nature, etc. of a roller to be excellent, and offer [become a simple equipment configuration, enable miniaturization and space-saving-ization, and] the anchorage device in which low-cost-izing is possible while aiming at solution of the fixing fault resulting from light-gage belts, such as meandering of a belt and a deflection, employing efficiently the advantage of a belt nip method

in which the conventional light-gage metal belt was used.

[0013]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention indicated by claim 1 Prepare an elastic body layer on a base material, and an ultrathin metal layer with a thickness of 0.03-0.15mm is formed on the elastic body layer concerned. It is characterized by preparing a mold release layer in the front face of the ultrathin metal layer concerned if needed, and the elastic body of revolution which forms big nip width of face in the fixing section by this, and can respond to the improvement in the engine performance of improvement in the speed of fixing, high-definition-izing, etc. is offered.

[0014] Here, as the above-mentioned base material, the thing of the shape of the shape of a tube formed with a metal or synthetic resin and a shaft is used, for example.

[0015] Moreover, what consists of an elastic body which consists of a copolymer of rubber or the foam of a synthetic-resin system and rubber, and synthetic resin as the above-mentioned elastic body layer, for example is used.

[0016] Furthermore, although the thickness of the above-mentioned ultrathin metal layer is set as 0.03-0.15mm, it is desirably set as 0.05mm or less.

[0017] Furthermore, as the above-mentioned mold release layer, what consists of release agents, such as a fluororesin, is used, for example.

[0018] By the way, as a technique about the body of revolution which comes to carry out the laminating of the metal layer of thin meat on an elastic body layer, what is indicated by JP,10-340023,A is already proposed, for example. The contents indicated by the claim of above-mentioned JP,10-340023,A are "the heating apparatus characterized by to have the press member which carried out a pressure welding partly to the roller which carries out the laminating of the elastic body layer which consists of an ingredient which has rodding and elasticity at least, the metal layer which consists of a metal, and the mold-release layer which consists of an ingredient which has a mold-release characteristic to this sequence one by one, and it comes to unify, and this roller, and a heating means heat said roller." About the metal of the above-mentioned contents, it is supposed that an ingredient is comparatively cheap and nickel, SUS, aluminum, etc. tend to process it that it is desirable, and the thickness is made desirable [the thickness of 0.02-0.5mm]. Moreover, as the processing approach of this roller, the seamless belt should be concretely formed by approaches, such as electrocasting. Since a still more nearly seamless metal belt is expensive, the approach of twisting a sheet-like metallic foil can manufacture comparatively easily, and cost is proposed it is cheap and are desirable.

[0019] However, the roller indicated by above-mentioned JP,10-340023,A is a heating means, is a thing aiming only at the fault solution at the time of heating, such as suppressing the thermal radiation to the interior and gathering temperature up effectiveness from a roller outside surface, and is not the purpose of corresponding to the improvement demand in the engine performance of improvement in the speed, high-definition-izing, etc. concerning an anchorage device.

[0020] On the other hand, this invention is the features with which the surface metal layer (especially seamless stainless steel layer) which consists of a **** light-gage metal is equipped. 1. Quantity rigidity / bending stress smallness 2. Spring nature / elastic-deformation 3. board thickness homogeneity 4. Light weight 5. Endurance and corrosion resistance - Abrasion resistance / raising-dust-less 6. Heat-resistant 7. Homogeneous 8. of thermal conductivity/temperature distribution Heat-capacity smallness 9. conductivity -- 10. magnetism 11. surface smooth nature 12. surface workability (drilling, micro processing, etc.) etc. -- Moreover, they are the features with which the elastic body layer which consists of foam of rubber or a synthetic-resin system etc. was equipped..... 1. Resiliency 2. Moldability 3. Adiathermic 4. Insulation (nonconductor)

5. Lightweight Etc. -- [-- 0021] It is the body of revolution constituted taking advantage of the features of both the metal layer of surface *****, and an internal elastic body layer, and the elastic body of revolution in which a heating means or not only a pressurization means but the thing to use as other means, for example, cleaning member etc., etc. is possible, and the general purpose which can realize fixing improvement in the speed of a printer, a copying machine, etc. and the cure against high

definition-ized is possible is offered.

[0022] Moreover, when the metal sleeve which it was characterized by using a seamless stainless steel sleeve as an ultrathin metal layer, and thin meat rounded off the metal layer, and was formed of welding in both ends is used, invention indicated by claim 2 avoids the fixing fault which originates in the joint of the welding part made in the metal layer, and is generated, and aims at much more improvement in the engine performance, such as fixable. Furthermore, it is high, and thermal resistance and workability are also low cost and that of stainless steel material are the optimal as the quality of the material of this invention. In addition, in invention indicated by claim 1, if the welding sleeve of 0.05mm level of board thickness is used for a metal layer, the endurance in the part of a welding seam will get extremely bad, and the life of a roller will fall greatly.

[0023] Furthermore, invention indicated by claim 3 is set to image formation equipments, such as a printer of an electrophotography method, and a copying machine. It is the toner image formed on the recorded material Heating - As pressurization body of revolution which carries out a pressure welding from the heating body of revolution to fuse or the rear face of a recorded material having used the elastic body of revolution of a publication for said claim 1 or either of 2 -- the description -- carrying out -- with -- **** -- the anchorage device with which nip width of face of the fixing section is enlarged, maintenance of temperature ***** to fixing and a pressure etc. is enabled, and fixing also with high-speed positive rotation is obtained is offered.

[0024] Invention indicated by claim 4 moreover, as body of revolution of both said heating body of revolution according to claim 3 and pressurization body of revolution It is characterized by using said claim 1 or elastic body of revolution given in either of 2. It becomes possible to form the big nip width of face stabilized in the fixing-section by this, and the anchorage device with which fixing also with positive enough a next door and high-speed rotation is obtained for maintenance of temperature ***** to fixing and a pressure etc. is offered.

[0025] Furthermore, invention indicated by claim 5 is set to image formation equipments, such as a printer of an electrophotography method, and a copying machine. A pressure welding is carried out to the front face of the pressurization body of revolution which pressurizes from the rear face of a recorded material at the time of toner image fixing. As a cleaning member which collects affixes, such as an offset toner adhering to the front face of the pressurization body of revolution concerned having used the elastic body of revolution of a publication for said claim 1 or either of 2 -- the description -- carrying out -- with -- **** -- the spot dirt of the recorded material resulting from the toner dirt of pressurization body of revolution is prevented, and the anchorage device with which an always good fixing image is obtained is offered.

[0026] In addition, in invention indicated by this claim 5, in using the elastic body of revolution of a publication for claim 1 or either of 2 as a cleaning member, the object for ** which an ultrathin metal layer makes the condition of having exposed to the front face is shown in the front face of the elastic body of revolution concerned, without preparing a mold release layer.

[0027]

[Embodiment of the Invention] Below, the gestalt of implementation of this invention is explained with reference to a drawing.

[0028] Gestalt 1 drawing 1 of operation is the laminated-structure explanatory view showing an example of the elastic body of revolution of light-gage metallic coating concerning the gestalt 1 of implementation of this invention.

[0029] In drawing 1, 1 is what shows the elastic body of revolution used as a heating roller of an anchorage device etc. this elastic body of revolution 1 The shape of the shape of a tube, and a shaft (in the example of illustration) formed with a metal or heat-resistant synthetic resin On the tube-like base material 2, bulk material and foam of rubber or a synthetic-resin system, For example, the elastic body layer 3 with a thickness of 3-8mm it is thin from silicone rubber etc. is covered. The laminating of the metal layer 4 which consists of a sleeve formed by carrying out the thinning of a metal, for example, stainless steel, the iron, etc. to 0.05mm or less desirably 0.03-0.15mm in thickness on it is carried out, and if needed, the mold release layer 5 which consists of release agents, such as a fluororesin, is formed

in the front face of the metal layer 4 concerned, and it is constituted.

[0030] Next, the manufacture approach of the above-mentioned elastic body of revolution 1 is explained. As this elastic body of revolution 1 is shown in drawing 1, inside the metal sleeve as a metal layer 4 The thing in which the elastic body layer 3 was formed on the base material 2 is inserted, or a base material 2 is arranged to the core of the metal sleeve 4. Between the metal sleeve 4 and a base material 2 It is filled up with the foam of the letter of a flow which consists of silicone rubber in the condition of not hardening etc., and the approach of making harden the foam of the letter of a flow concerned, and using as the elastic body layer 3 is mentioned.

[0031] The metal sleeve 4 has the desirable seamless sleeve which does not have joints, such as welding, in the direction of an axis, and as mentioned above, endurance is not low suitable for the metal sleeve with a welding seam. Moreover, as the quality of the material of this metal sleeve 4, it conflicts in having mentioned above, and excels in reason rigidity, spring nature, endurance, etc., and the processible sleeve made from stainless steel is the optimal at low cost.

[0032] When gestalt 2 drawing 2 of operation shows the gestalt 2 of implementation of this invention and the same sign is attached and explained to the same part as the gestalt 1 of said operation, with the gestalt 2 of this operation It is the toner image formed on the recorded material in image formation equipments, such as a printer of an electrophotography method, and a copying machine, Heating - As pressurization body of revolution which carries out a pressure welding from the heating body of revolution to fuse or the rear face of a recorded material Prepare an elastic body layer on a base material, and an ultrathin metal layer with a thickness of 0.03-0.15mm is formed on the elastic body layer concerned. the elastic body of revolution characterized by preparing a mold release layer in the front face of the-ultrathin-metal-layer concerned-if-needed -- or it is constituted so that the elastic body of -- revolution characterized by using a seamless stainless steel sleeve as the above-mentioned ultrathin metal layer may be used.

[0033] Drawing 2 is the outline block diagram showing the anchorage device which applied the elastic body of revolution of light-gage metallic coating concerning the gestalt 2 of implementation of this invention as a heating roller.

[0034] In image formation equipments with which it was equipped with the above-mentioned anchorage device, such as a printer of an electrophotography method, and a copying machine, using a well-known image formation process, the recorded material 11 with which the toner image 12 was formed on the recorded materials 11, such as a record form, and this toner image 12 was formed is the culmination of an image formation process, and is conveyed by the anchorage device 13 with which the elastic body of revolution of light-gage metallic coating of this invention was applied as a heating roller.

[0035] The heating roller 14 as elastic body of revolution formed like the gestalt 1 of the above-mentioned implementation as this anchorage device 13 was shown in drawing 2, On the base material of the shape of a cylinder formed with a metal or heat-resistant synthetic resin, the foam of rubber or a synthetic-resin system, For example, the pressure welding of the pressurization roller 15 of each other which comes comparatively thickly to cover the elastic body layer which consists of silicone rubber etc. is carried out, and it is constituted so that the recorded material 11 with which the toner image 12 was formed in both the rollers 14 and the nip section 16 between 15 may be passed. As a method which heats the above-mentioned heating roller 14 For example, the method which arranges a heating element 17 near the upstream of the pressure-welding nip section of the heating roller concerned, and heats the front face of a heating roller 14 directly with this heating element 17, Although there is a magnetic-induction heating method which generates a field with a magnetic field generating means by which it does not illustrate, produces an eddy current, and makes a heating roller 14 generate heat directly with the Joule's heat Even if it is which method, the metal layer 4 of surface coating consists of metals, such as stainless steel, and since it is moreover ultrathin and heat capacity is [thermal conductivity is also good and] also small, the heating roller 14 as elastic body of revolution of light-gage metallic coating of this invention is suitable as a heating roller with sufficient thermal efficiency.

[0036] Although the improvement in the speed and the fixable improvement in fixing are called for in recent years with improvement in the speed of image formation equipments, such as a printer which

intensifies increasingly, and a copying machine, and high definition-ized competition, it is necessary to shorten the pass time in the fixing section of a recorded material especially for improvement in the speed. For that purpose, although the device which enlarges pressure-welding nip width of face for supplying a heating value required for fixing to the nip section enough and maintenance of a uniform fixing pressure is needed According to this invention, with the thermal conductivity of the **** light-gage metal which covers the front face of a heating roller, rigidity, spring nature, and resiliency with a proper elastic body layer The reservation of sufficient nip width of face which can hold temperature and a pressure required for fixing can be realized, and fixable improvement and stabilization can be enabled at improvement in the speed and coincidence of fixing. In addition, since nip width of face can be enlarged with surface resiliency, it becomes possible to minor-diameter-ize a heating roller etc. and to use equipment as a compact, and the effectiveness of realizing space-saving-ization of an anchorage device with simple structure is also born.

[0037] Since other configurations and operations are the same as that of the gestalt 1 of said operation, the explanation is omitted.

[0038] Gestalt 3 drawing 3 of operation shows the gestalt 3 of implementation of this invention, and if the same sign is attached and explained to the same part as the gestalt of said operation, it consists of gestalten 3 of this operation so that the elastic body of revolution of light-gage metallic coating may be used as a pressurization roller.

[0039] Drawing 3 is the outline block diagram showing the anchorage device which applied the elastic body of revolution of light-gage metallic coating concerning the gestalt 3 of implementation of this invention as a pressurization roller.

[0040] The anchorage device equipped with the heating body of revolution of an endless-belt type using the endless belt 23 with which drawing 3 (a), (b), and (c) were ****(ed) by two rollers 21 and 22 with the function of a drive and tension, and drawing 3 (d) show the anchorage device equipped with the heating body of revolution of a roller type or a hollow belt type. In addition, in drawing 3 (a), 25 shows the heating element which carries out a pressure welding to the front face of the pressurization roller 24 through an endless belt 23.

[0041] The toner image 12 formed on the recorded material 11 is heated and fused by the heating body of revolution 23 like the gestalt 2 of said operation, and it presses with the pressurization roller 24 which applied the elastic body of revolution of light-gage metallic coating which is this invention article by which the pressure welding was carried out to coincidence from the rear face, and let a toner image be a fixing image. Set correspondence is possible for the pressurization roller 24 which applied the elastic body of revolution of light-gage metallic coating which is this invention article even if it is the heating body of revolution of which method of drawing 3 (a), (b), (c), and (d). With the rigidity of the ultrathin metal which covers the front face of the pressurization roller 24, spring nature, and resiliency with a proper elastic body layer, the reservation of sufficient nip width of face which can hold temperature and a pressure required for fixing is realized, fixable improvement can be enabled at improvement in the speed and coincidence of fixing, and high definition-ization can be realized.

[0042] Although the lamination of the above-mentioned pressurization roller 24 is the same as that of the heating roller shown in drawing 1 fundamentally, while setting up the thickness and the diameter of a base material more greatly than a heating roller in order to aim at pressurization unlike a heating roller in using the elastic body of revolution concerned as a pressurization roller 24, it is desirable to set up the thickness of an elastic body layer thinly and to set up the thickness of a metal layer thickly further.

[0043] In addition, as compared with the pressurization roller manufactured with conventional silicone rubber etc., this invention article enables all that a **** light-gage metal layer has to form the proper nip section by high rigidity, spring nature, thermal conductivity, surface smooth nature, etc., and fixable improvement in the nip section can be realized. In addition, it becomes possible to minor-diameter-ize the diameter of a roller and to use equipment as a compact, and the effectiveness which enables space-saving-ization of an anchorage device with simple structure is also born. Furthermore, since the function as an auxiliary heating object can also be given by choosing an exoergic method if needed, high-level electrical-power-consumption-saving-ization is enabled by carrying out temperature management near

the nip section highly. In addition, the offset toner which carried out transition adhesion by the after heat of a metal layer further at the pressurization roller can be softened on a pressurization roller, and it exfoliates by the cleaning member and becomes easy to collect.

[0044] Since other configurations and operations are the same as that of the gestalt 1 of said operation, the explanation is omitted.

[0045] When gestalt 4 drawing 4 of operation shows the gestalt 4 of implementation of this invention and the same sign is attached and explained to the same part as the gestalt of said operation, with the gestalt 4 of this operation As body of revolution of both heating body of revolution and pressurization body of revolution, an elastic body layer is prepared on a base material. An ultrathin metal layer with a thickness of 0.03-0.15mm is formed on the elastic body layer concerned. the elastic body of revolution characterized by preparing a mold release layer in the front face of the ultrathin metal layer concerned if needed -- or it is constituted so that the elastic body of revolution characterized by using a seamless stainless steel sleeve as the above-mentioned ultrathin metal layer may be used.

[0046] Drawing 4 is the outline block diagram showing the anchorage device which applied the elastic body of revolution of light-gage metallic coating concerning the gestalt 4 of implementation of this invention as a heating roller and a pressurization roller.

[0047] In image formation equipments with which it was equipped with the above-mentioned anchorage device, such as a printer of an electrophotography method, and a copying machine It is heating - by the heating roller 33 which applied the elastic body of revolution of light-gage metallic coating which is this invention article about the toner image 32 formed on the recorded material 31 in the culmination of image formation. It fuses. The anchorage device which is pressed with the pressurization roller 34 which applied the elastic body of revolution of light-gage-metallic-coating which is this invention article to coincidence from the rear face of a recorded material 31, and uses the toner image 32 as a fixing image is shown. It is the structure characterized by equipping this invention with both the heating roller concerning the gestalt 2 of said operation, and the pressurization roller concerning the gestalt 3 of said operation, and the anchorage device which makes a high speed and fixable [high] possible can be realized corresponding to the demand of improvement in the speed of image formation equipments, such as a printer and a copying machine, and high-definition-izing. Moreover, since it becomes the simplest structure, maintenance nature is high, and since a metal layer is ***** again, minor diameter-ization of a roller also becomes possible, it is compact and the anchorage device used as space-saving can be offered.

[0048] Since other configurations and operations are the same as that of the gestalt 1 of said operation, the explanation is omitted.

[0049] When gestalt 5 drawing 5 of operation shows the gestalt 5 of implementation of this invention and the same sign is attached and explained to the same part as the gestalt of said operation, with the gestalt 5 of this operation In image formation equipments, such as a printer of an electrophotography method, and a copying machine, a pressure welding is carried out to the front face of the pressurization body of revolution which pressurizes from the rear face of a recorded material at the time of toner image fixing. As a cleaning member which collects affixes, such as an offset toner adhering to the front face of the pressurization body of revolution concerned Prepare an elastic body layer on a base material, and an ultrathin metal layer with a thickness of 0.03-0.15mm is formed on the elastic body layer concerned. the elastic body of revolution characterized by preparing a mold release layer in the front face of the ultrathin metal layer concerned if needed -- or it is constituted so that the elastic body of revolution characterized by using a seamless stainless steel sleeve as the above-mentioned ultrathin metal layer may be used.

[0050] Drawing 5 is the outline block diagram showing the anchorage device which applied the elastic body of revolution of light-gage metallic coating concerning the gestalt 5 of implementation of this invention as a cleaning member of a pressurization roller. In addition, although this Fig. explains the cleaning member of a pressurization roller to an example, it is natural. [of a pressure welding being carried out to body of revolution, such as other rollers, and it being able to apply as a cleaning member]

[0051] In case the toner image 42 which is on a recorded material 41 in an anchorage device passes the

nip section by which the pressure welding was carried out with the heating roller 43 and the pressurization roller 44. The so-called offset toner which the toner of the minute amount to which a recorded material 41 was not fixed by a certain fault transferred to the heating roller 43 side transfers and adheres at the pressurization roller 44. It transfers to the recorded material 41 which follows and passes the nip section, and punctate dirt is generated on the front face of a recorded material 41 in many cases.

[0052] Although there is also a proposal of an anchorage device equipped with a cleaning member in order to prevent the punctate dirt which collects the offset toners adhering to such a pressurization roller 44, and is generated in a recorded material 41, the toner which adhered with the pressurization roller by the conventional silicone rubber material does not carry out softening deformation, but the recovery by the cleaning member is bad, and it is difficult to prevent punctate dirt generating certainly.

[0053] then, the condition of having softened the toner with the heat which remains in a metal layer by carrying out the pressure welding of the elastic body of revolution of light-gage metallic coating of this invention to the pressurization roller 44, and using it as a cleaning member 45 -- becoming -- in addition -- and since a touch area increases with surface resiliency, the toner adhering to pressurization roller 44 front face is certainly recoverable.

[0054] Gestalt 6 drawing 6 of operation shows the gestalt 6 of implementation of this invention, and if the same sign is attached and explained to the same part as the gestalt of said operation, it will use what carried out the thinning of the cylindrical element tube which consists of a metal in which plastic working is possible as a metal layer used for elastic body of revolution to predetermined thickness by thinning processing with the gestalt 6 of this operation.

[0055] Moreover, what carried out the thinning of the cylindrical element tube without a joint to predetermined thickness by thinning processing may be used in the direction of an axis which consists of a metal in which plastic working is possible as a metal layer used for the above-mentioned elastic body of revolution.

[0056] Furthermore, the metal layer used for the above-mentioned elastic body of revolution is manufactured according to the press process which forms a cup-like element tube, and the thinning process which carries out thinning to predetermined thickness by carrying out ironing of the cylindrical section of said metal cup-like element tube by performing press working of sheet metal to the metal plate in which plastic working is possible.

[0057] Furthermore, the metal layer used for the above-mentioned elastic body of revolution. The cylindrical element tube which consists of a metal in which plastic working is possible in for example, the condition of having made it rotating around an axis. By performing spinning to the peripheral wall of the cylindrical element tube concerned, it is carried out in the middle of before and after the thinning process which carries out thinning to predetermined thickness, and said thinning process once [at least] or more, and you may manufacture at least according to the annealing process of said metal cup-like element tube which carries out annealing processing of the cylindrical section.

[0058] Furthermore, the metal layer used for the above-mentioned elastic body of revolution may be manufactured according to the thinning process which carries out thinning to predetermined thickness by carrying out the drawing of the cylindrical element tube which consists of a metal in which plastic working is possible.

[0059] Furthermore, the metal layer used for the above-mentioned elastic body of revolution may be manufactured according to the thinning process which carries out thinning to predetermined thickness by inserting in the interior of a blister expansion processing machine the cylindrical element tube which consists of a metal in which plastic working is possible, applying a pressure and carrying out expansion processing from the interior, to the cylindrical element tube concerned.

[0060] Next, the manufacture approach of the metal sleeve concerning the gestalt 6 of implementation of this invention is explained concretely.

[0061] a process 1 -- first, as shown in drawing 6 (a), the plate-like metal plate 121 used as the material of the metal sleeve 4 is prepared. As for this plate-like metal plate 121, that board thickness is set as about 0.1-1mm. Although the thing of the quality of the material of arbitration can be used if it is the

metallic material in which plastic working is possible as the quality of the material of this metal sleeve 4, ductility is high also in especially inside and it is desirable to use SUS whose elasticity improves with work hardening, nickel alloy, Ti alloy, aluminum alloy, Cu alloy, Fe, etc. With the gestalt 1 of this operation, SUS is used as the quality of the material of the metal endless belts 8 and 11. SUS304 is desirable especially.

[0062] As the above-mentioned plate-like metal plate 121 is shown in drawing 6 (a), deep drawing is performed by press working of sheet metal using the punch 123 and female mold 122 of a deep-drawing machine, and the cylindrical element tube 124 of a cup configuration as shown in drawing 6 (b) is formed. Although the desirable board thickness of the cylindrical element tube 24 of this cup configuration is 0.1-0.15mm, it may be board thickness other than this.

[0063] After that [process 2], it equips with the cylindrical element tube 124 in the condition of having fitted into the mold 126 among the shape of a cylinder of the ironing machine 125 as shown in drawing 6 (c), and two or more dies bodies 127 from which an outer diameter differs are arranged outside. and while moving a mold 126 along the direction of arrow-head A among the above-mentioned ironing machines 125, 2-3 steps of ironing is performed, and it is shown in drawing 6 (d) -- as -- the cylindrical element tube 124 -- about about 0.03-0.05mm in thickness -- **** thinning -- and it long-picture-izes. In addition, the case where either a dies body or an inside mold, and both are rotated is also considered.

[0064] Thus, the manufactured metal sleeve 4 does not have thickness nonuniformity, either, and a configuration serves as a perfect circle without distortion, and can be used for it as a metal layer of highly precise body of revolution.

[0065] By gestalt 7 drawing 7 of operation showing the gestalt 7 of implementation of this invention, and the manufacture-approach of the metal sleeve concerning the gestalt 7 of this operation being in the condition of having rotated around the axis the cylindrical element tube which consists of a metal in which plastic working is possible, and performing spinning to the peripheral wall of the cylindrical element tube concerned, it constitutes so that the thinning process which carries out thinning to predetermined thickness may be provided.

[0066] Next, the manufacture approach of the metal sleeve concerning the gestalt 7 of implementation of this invention is explained concretely.

[0067] a process 1 -- first, as shown in drawing 7 (a), the cylindrical element tube 131 which consists of a metallic material in which plastic working is possible is formed. Although this cylindrical element tube 131 may be the seamless pipe formed so that there might be no joint in the direction of an axis like the gestalt 1 of said operation even if it is the welding pipe which rounded off the plate-like metal plate which is not illustrated in the shape of a cylinder, and welded those both ends by laser beam welding etc., it is desirable to use a seamless pipe without a joint in the direction of an axis.

[0068] As shown in drawing 7 (b), a process 2, next the above-mentioned cylindrical element tube 131 are in the condition inserted in at the tip of the rotation standard 133 of a spinning lathe 132, and a rotation drive is carried out. And the external pressure roller 134 is contacted to the peripheral wall of the revolving cylindrical element tube 131, and it pushes against homogeneity, and is made to move in the direction of arrow-head B. carrying out like this -- the external pressure roller 134 -- the peripheral wall of the cylindrical element tube 131 -- a rat tail and thinning -- and it is long-picture-ized. The thickness shown in drawing 7 (c) by this spinning forms the light-gage metal sleeve 35 which is about 0.03-0.15mm.

[0069] In order to improve workability to the cylindrical element tube 31 if needed [process 3] in the middle of before and after a thinning process, annealing processing is performed for the purpose of removing internal stress. The light-gage metal endless seamless sleeve 4 is manufactured by obtaining thinning and the long-picture-ized light-gage metal sleeve 35 like the above after an appropriate time.

[0070] Thus, the manufactured metal sleeve 4 does not have thickness nonuniformity, either, and a configuration serves as a perfect circle without distortion, and can be used for it as a metal layer of highly precise highly precise body of revolution.

[0071] Since other configurations and operations are the same as that of the gestalt 1 of said operation, the explanation is omitted.

[0072]

[Effect of the Invention] As mentioned above, according to this invention, in image formation equipments, such as a printer of an electrophotography method, and a copying machine, it becomes possible to offer engine-performance competition which intensifies increasingly in recent years, and the anchorage device which meets the demand of high-definition[full-color-izing and]-izing, improvement in the speed, electrical-power-consumption-saving-izing, etc. especially.

[0073] Desirably 0.03-0.5mm in thickness under the metal layer by **** light-gage metal division stainless steel 0.05mm or less etc. If the elastic body of revolution of light-gage metallic coating of this invention which comes to form elastic body layers, such as silicone rubber, is applied as the heating object of an anchorage device, one body of revolution of a pressurization object, or body of revolution of both a heating object and a pressurization object The big nip width of face which becomes possible by the high spring nature (elasticity) and rigidity which the stainless steel sleeve of surface ***** has, surface smooth nature, etc. can be formed in the fixing section. By choosing the heating method which becomes the most effective using the thermal conductivity which lengthens pass time in the fixing nip section of a recorded material, and the stainless steel of a surface layer has Equalization of the temperature distribution of stable maintenance of the predetermined temperature which fixing takes, and the nip section, and pressure distribution etc. is attained, and fixable improvement can be attained to improvement in the speed of fixing, and coincidence. Moreover, the anchorage device of an electrical-power-consumption-saving mold with little heating time is realizable.

[0074] In addition, the structure as an anchorage device turns simple up, and becomes long lasting [a roller] for metallic coating of high rigidity and abrasion resistance, maintenance nature is high, and since it can take nip width of face with surface resiliency, minor diameter-ization of a roller can also become possible and it can realize miniaturization of equipment, space-saving-izing, and saving-resources-ization.

[0075] Furthermore, if the elastic body of revolution of light-gage metallic coating of this invention is applied as a cleaning member of the body of revolution in the interior of equipment, the offset toners adhering to body of revolution can be collected certainly, and it will become possible to prevent the image dirt in which an offset toner carries out transition adhesion and which it generates in a recorded material.

[Translation done.]

* NOTICES *

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EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, according to this invention, in image formation equipments, such as a printer of an electrophotography method, and a copying machine, it becomes possible to offer engine-performance competition which intensifies increasingly in recent years, and the anchorage device which meets the demand of high-definition[full-color-izing and]-izing, improvement in the speed, electrical-power-consumption-saving-izing, etc. especially.

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[0075] Furthermore, if the elastic body of revolution of light-gage metallic coating of this invention is applied as a cleaning member of the body of revolution in the interior of equipment, the offset toners adhering to body of revolution can be collected certainly, and it will become possible to prevent the image dirt in which an offset toner carries out transition adhesion and which it generates in a recorded material.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, invention indicated by claim 1 Prepare an elastic body layer on a base material, and an ultrathin metal layer with a thickness of 0.03-0.15mm is formed on the elastic body layer concerned. It is characterized by preparing a mold release layer in the front face of the ultrathin metal layer concerned if needed, and the elastic body of revolution which forms big nip width of face in the fixing section by this, and can respond to the improvement in the engine performance of improvement in the speed of fixing, high-definition-izing, etc. is offered.

[0014] Here, as the above-mentioned base material, the thing of the shape of the shape of a tube formed with a metal or synthetic resin and a shaft is used, for example.

[0015] Moreover, what consists of an elastic body which consists of a copolymer of rubber or the foam of a synthetic-resin system and rubber, and synthetic resin as the above-mentioned elastic body layer, for example is used.

[0016] Furthermore, although the thickness of the above-mentioned ultrathin metal layer is set as 0.03-0.15mm, it is desirably set as 0.05mm or less.

[0017] Furthermore, as the above-mentioned mold release layer, what consists of release agents, such as a fluoro-resin, is used, for example.

[0018] By the way, as a technique about the body of revolution which comes to carry out the laminating of the metal layer of thin meat on an elastic body layer, what is indicated by JP,10-340023,A is already proposed, for example. The contents indicated by the claim of above-mentioned JP,10-340023,A are "the heating apparatus characterized by to have the press member which carried out a pressure welding partly to the roller which carries out the laminating of the elastic body layer which consists of an ingredient which has rodding and elasticity at least, the metal layer which consists of a metal, and the mold-release layer which consists of an ingredient which has a mold-release characteristic to this sequence one by one, and it comes to unify, and this roller, and a heating means heat said roller." About the metal of the above-mentioned contents, it is supposed that an ingredient is comparatively cheap and nickel, SUS, aluminum, etc. tend to process it that it is desirable, and the thickness is made desirable [the thickness of 0.02-0.5mm]. Moreover, as the processing approach of this roller, the seamless belt should be concretely formed by approaches, such as electrocasting. Since a still more nearly seamless metal belt is expensive, the approach of twisting a sheet-like metallic foil can manufacture comparatively easily, and cost is proposed it is cheap and are desirable.

[0019] However, the roller indicated by above-mentioned JP,10-340023,A is a heating means, is a thing aiming only at the fault solution at the time of heating, such as suppressing the thermal radiation to the interior and gathering temperature up effectiveness from a roller outside surface, and is not the purpose of corresponding to the improvement demand in the engine performance of improvement in the speed, high-definition-izing, etc. concerning an anchorage device.

[0020] On the other hand, this invention is the features with which the surface metal layer (especially seamless stainless steel layer) which consists of a **** light-gage metal is equipped. 1. Quantity rigidity / bending stress smallness 2. Spring nature / elastic-deformation 3. board thickness homogeneity

4. Light weight 5. Endurance and corrosion resistance - Abrasion resistance / raising-dust-less 6. Heat-resistant 7. Homogeneous 8. of thermal conductivity/temperature distribution Heat-capacity smallness 9. conductivity -- 10. magnetism 11. surface smooth nature 12. surface workability (drilling, micro processing, etc.) etc. -- Moreover, they are the features with which the elastic body layer which consists of foam of rubber or a synthetic-resin system etc. was equipped..... 1. Resiliency 2. Moldability 3.

Adiathermic 4. Insulation (nonconductor)

5. Lightweight Etc. -- [-- 0021] It is the body of revolution constituted taking advantage of the features of both the metal layer of surface *****, and an internal elastic body layer, and the elastic body of revolution in which a heating means or not only a pressurization means but the thing to use as other means, for example, cleaning member etc., etc. is possible, and the general purpose which can realize fixing improvement in the speed of a printer, a copying machine, etc. and the cure against high definition-ized is possible is offered.

[0022] Moreover, when the metal sleeve which it was characterized by using a seamless stainless steel sleeve as an ultrathin metal layer, and thin meat rounded off the metal layer, and was formed of welding in both ends is used, invention indicated by claim 2 avoids the fixing fault which originates in the joint of the welding part made in the metal layer, and is generated, and aims at much more improvement in the engine performance, such as fixable. Furthermore, it is high, and thermal resistance and workability are also low cost and that of stainless steel material are the optimal as the quality of the material of this invention. In addition, in invention indicated by claim 1, if the welding sleeve of 0.05mm level of board thickness is used for a metal layer, the endurance in the part of a welding seam will get extremely bad, and the life of a roller will fall greatly.

[0023] Furthermore, invention indicated by claim 3 is set to image formation equipments, such as a printer of an electrophotography method, and a copying machine. It is the toner image formed on the recorded material Heating - As pressurization body of revolution which carries out a pressure welding from the heating body of revolution to fuse or the rear face of a recorded material having used the elastic body of revolution of a publication for said claim 1 or either of 2 -- the description -- carrying out -- with -- **** -- the anchorage device with which nip width of face of the fixing section is enlarged, maintenance of temperature ***** to fixing and a pressure etc. is enabled, and fixing also with high-speed positive rotation is obtained is offered.

[0024] Invention indicated by claim 4 moreover, as body of revolution of both said heating body of revolution according to claim 3 and pressurization body of revolution It is characterized by using said claim 1 or elastic body of revolution given in either of 2. It becomes possible to form the big nip width of face stabilized in the fixing section by this, and the anchorage device with which fixing also with positive enough a next door and high-speed rotation is obtained for maintenance of temperature ***** to fixing and a pressure etc. is offered.

[0025] Furthermore, invention indicated by claim 5 is set to image formation equipments, such as a printer of an electrophotography method, and a copying machine. A pressure welding is carried out to the front face of the pressurization body of revolution which pressurizes from the rear face of a recorded material at the time of toner image fixing. As a cleaning member which collects affixes, such as an offset toner adhering to the front face of the pressurization body of revolution concerned having used the elastic body of revolution of a publication for said claim 1 or either of 2 -- the description -- carrying out -- with -- **** -- the spot dirt of the recorded material resulting from the toner dirt of pressurization body of revolution is prevented, and the anchorage device with which an always good fixing image is obtained is offered.

[0026] In addition, in invention indicated by this claim 5, in using the elastic body of revolution of a publication for claim 1 or either of 2 as a cleaning member, the object for ** which an ultrathin metal layer makes the condition of having exposed to the front face is shown in the front face of the elastic body of revolution concerned, without preparing a mold release layer.

[0027]

[Embodiment of the Invention] Below, the gestalt of implementation of this invention is explained with reference to a drawing.

[0028] Gestalt 1 drawing 1 of operation is the laminated-structure explanatory view showing an example of the elastic body of revolution of light-gage metallic coating concerning the gestalt 1 of implementation of this invention.

[0029] In drawing 1, 1 is what shows the elastic body of revolution used as a heating roller of an anchorage device etc. this elastic body of revolution 1 The shape of the shape of a tube, and a shaft (in the example of illustration) formed with a metal or heat-resistant synthetic resin On the tube-like base material 2, bulk material and foam of rubber or a synthetic-resin system, For example, the elastic body layer 3 with a thickness of 3-8mm it is thin from silicone rubber etc. is covered. The laminating of the metal layer 4 which consists of a sleeve formed by carrying out the thinning of a metal, for example, stainless steel, the iron, etc. to 0.05mm or less desirably 0.03-0.15mm in thickness on it is carried out, and if needed, the mold release layer 5 which consists of release agents, such as a fluororesin, is formed in the front face of the metal layer 4 concerned, and it is constituted.

[0030] Next, the manufacture approach of the above-mentioned elastic body of revolution 1 is explained. As this elastic body of revolution 1 is shown in drawing 1, inside the metal sleeve as a metal layer 4 The thing in which the elastic body layer 3 was formed on the base material 2 is inserted, or a base material 2 is arranged to the core of the metal sleeve 4. Between the metal sleeve 4 and a base material 2 It is filled up with the foam of the letter of a flow which consists of silicone rubber in the condition of not hardening etc., and the approach of making harden the foam of the letter of a flow concerned, and using as the elastic body layer 3 is mentioned.

[0031] The metal sleeve 4 has the desirable seamless sleeve which does not have joints, such as welding, in the direction of an axis, and as mentioned above, endurance is not low suitable for the metal sleeve with a welding seam. Moreover, as the quality of the material of this metal sleeve 4, it conflicts in having mentioned above, and excels in reason rigidity, spring nature, endurance, etc., and the processible sleeve made from stainless steel is the optimal at low cost.

[0032] When gestalt 2 drawing 2 of operation shows the gestalt 2 of implementation of this invention and the same sign is attached and explained to the same part as the gestalt 1 of said operation, with the gestalt 2 of this operation It is the toner image formed on the recorded material in image formation equipments, such as a printer of an electrophotography method, and a copying machine, Heating - As pressurization body of revolution which carries out a pressure welding from the heating body of revolution to fuse or the rear face of a recorded material Prepare an elastic body layer on a base material, and an ultrathin metal layer with a thickness of 0.03-0.15mm is formed on the elastic body layer concerned. the elastic body of revolution characterized by preparing a mold release layer in the front face of the ultrathin metal layer concerned if needed -- or it is constituted so that the elastic body of revolution characterized by using a seamless stainless steel sleeve as the above-mentioned ultrathin metal layer may be used.

[0033] Drawing 2 is the outline block diagram showing the anchorage device which applied the elastic body of revolution of light-gage metallic coating concerning the gestalt 2 of implementation of this invention as a heating roller.

[0034] In image formation equipments with which it was equipped with the above-mentioned anchorage device, such as a printer of an electrophotography method, and a copying machine, using a well-known image formation process, the recorded material 11 with which the toner image 12 was formed on the recorded materials 11, such as a record form, and this toner image 12 was formed is the culmination of an image formation process, and is conveyed by the anchorage device 13 with which the elastic body of revolution of light-gage metallic coating of this invention was applied as a heating roller.

[0035] The heating roller 14 as elastic body of revolution formed like the gestalt 1 of the above-mentioned implementation as this anchorage device 13 was shown in drawing 2, On the base material of the shape of a cylinder formed with a metal or heat-resistant synthetic resin, the foam of rubber or a synthetic-resin system, For example, the pressure welding of the pressurization roller 15 of each other which comes comparatively thickly to cover the elastic body layer which consists of silicone rubber etc. is carried out, and it is constituted so that the recorded material 11 with which the toner image 12 was formed in both the rollers 14 and the nip section 16 between 15 may be passed. As a method which heats

the above-mentioned heating roller 14 For example, the method which arranges a heating element 17 near the upstream of the pressure-welding nip section of the heating roller concerned, and heats the front face of a heating roller 14 directly with this heating element 17, Although there is a magnetic-induction heating method which generates a field with a magnetic field generating means by which it does not illustrate, produces an eddy current, and makes a heating roller 14 generate heat directly with the Joule's heat Even if it is which method, the metal layer 4 of surface coating consists of metals, such as stainless steel, and since it is moreover ultrathin and heat capacity is [thermal conductivity is also good and] also small, the heating roller 14 as elastic body of revolution of light-gage metallic coating of this invention is suitable as a heating roller with sufficient thermal efficiency.

[0036] Although the improvement in the speed and the fixable improvement in fixing are called for in recent years with improvement in the speed of image formation equipments, such as a printer which intensifies increasingly, and a copying machine, and high definition-ized competition, it is necessary to shorten the pass time in the fixing section of a recorded material especially for improvement in the speed. For that purpose, although the device which enlarges pressure-welding nip width of face for supplying a heating value required for fixing to the nip section enough and maintenance of a uniform fixing pressure is needed According to this invention, with the thermal conductivity of the **** light-gage metal which covers the front face of a heating roller, rigidity, spring nature, and resiliency with a proper elastic body layer The reservation of sufficient nip width of face which can hold temperature and a pressure required for fixing can be realized, and fixable improvement and stabilization can be enabled at improvement in the speed and coincidence of fixing. In addition, since nip width of face can be enlarged with surface resiliency, it becomes possible to minor-diameter-ize a heating roller etc. and to use equipment as a compact, and the effectiveness of realizing space-saving-ization of an anchorage device with simple structure is also born.

[0037] Since other configurations and operations are the same as that of the gestalt 1 of said operation, the explanation is omitted.

[0038] Gestalt 3 drawing 3 of operation shows the gestalt 3 of implementation of this invention, and if the same sign is attached and explained to the same part as the gestalt of said operation, it consists of gestalten 3 of this operation so that the elastic body of revolution of light-gage metallic coating may be used as a pressurization roller.

[0039] Drawing 3 is the outline block diagram showing the anchorage device which applied the elastic body of revolution of light-gage metallic coating concerning the gestalt 3 of implementation of this invention as a pressurization roller.

[0040] The anchorage device equipped with the heating body of revolution of an endless-belt type using the endless belt 23 with which drawing 3 (a), (b), and (c) were ****(ed) by two rollers 21 and 22 with the function of a drive and tension, and drawing 3 (d) show the anchorage device equipped with the heating body of revolution of a roller type or a hollow belt type. In addition, in drawing 3 (a), 25 shows the heating element which carries out a pressure welding to the front face of the pressurization roller 24 through an endless belt 23.

[0041] The toner image 12 formed on the recorded material 11 is heated and fused by the heating body of revolution 23 like the gestalt 2 of said operation, and it presses with the pressurization roller 24 which applied the elastic body of revolution of light-gage metallic coating which is this invention article by which the pressure welding was carried out to coincidence from the rear face, and let a toner image be a fixing image. Set correspondence is possible for the pressurization roller 24 which applied the elastic body of revolution of light-gage metallic coating which is this invention article even if it is the heating body of revolution of which method of drawing 3 (a), (b), (c), and (d). With the rigidity of the ultrathin metal which covers the front face of the pressurization roller 24, spring nature, and resiliency with a proper elastic body layer, the reservation of sufficient nip width of face which can hold temperature and a pressure required for fixing is realized, fixable improvement can be enabled at improvement in the speed and coincidence of fixing, and high definition-ization can be realized.

[0042] Although the lamination of the above-mentioned pressurization roller 24 is the same as that of the heating roller shown in drawing 1 fundamentally, while setting up the thickness and the diameter of

a base material more greatly than a heating roller in order to aim at pressurization unlike a heating roller in using the elastic body of revolution concerned as a pressurization roller 24, it is desirable to set up the thickness of an elastic body layer thinly and to set up the thickness of a metal layer thickly further.

[0043] In addition, as compared with the pressurization roller manufactured with conventional silicone rubber etc., this invention article enables all that a **** light-gage metal layer has to form the proper nip section by high rigidity, spring nature, thermal conductivity, surface smooth nature, etc., and fixable improvement in the nip section can be realized. In addition, it becomes possible to minor-diameter-ize the diameter of a roller and to use equipment as a compact, and the effectiveness which enables space-saving-ization of an anchorage device with simple structure is also born. Furthermore, since the function as an auxiliary heating object can also be given by choosing an exoergic method if needed, high-level electrical-power-consumption-saving-ization is enabled by carrying out temperature management near the nip section highly. In addition, the offset toner which carried out transition adhesion by the after heat of a metal layer further at the pressurization roller can be softened on a pressurization roller, and it exfoliates by the cleaning member and becomes easy to collect.

[0044] Since other configurations and operations are the same as that of the gestalt 1 of said operation, the explanation is omitted.

[0045] When gestalt 4 drawing 4

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